Geophysical Research Abstracts
Vol. 16, EGU2014-7001, 2014
EGU General Assembly 2014


# Can we use tide gauges, steric reconstructions and altimetry to estimate the distribution of the recent addition of water mass to the ocean?

Clare Bellingham, Ric Williams, Simon Holgate, and Chris Hughes
National Oceanography Centre Liverpool, United Kingdom (crbilhm@noc.ac.uk)

The recent global mean sea level rise is dominated by the addition of water to the oceans, accounting for around two thirds of the increase. In contrast, altimetry trends from 1993 to 2010 reveal that the local trends are dominated by the steric contribution, involving density expansion from warming and freshening. We explore an intermediate view between the global and local reconstructions based upon zonal averaging. By combining altimetry or tide gauges along with steric reconstructions, we provide two independent estimates of the zonal average of the mass component of sea level trends. We find that the trend in the increase of mass is spatially dependent and can be partly explained using mass redistribution predictions from gravitational fingerprints (Tamisiea 2011). Our two estimates, though, have different zonally averaged patterns. We find that the mass contribution implied by altimetry results in a higher rate of sea level rise in the southern hemisphere and the tropics, while the tide gauges imply a higher rate of rise within the tropics. These different views might be reconciled by the sparse tide gauge data in the southern hemisphere. We show that while various land movement corrections at each gauge can alter the magnitude of the trend, this does not impact on the general shape of their distributions.